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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,007	09/24/2003	Rie Sato	242635US6RD	1801

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EXAMINER	
CHIU, TSZ K	

ART UNIT	PAPER NUMBER
2822	

NOTIFICATION DATE	DELIVERY MODE
12/01/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/669,007	SATO ET AL.	
	Examiner	Art Unit	
	Tsz K. Chiu	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5 and 7-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Carey et al. (U.S. Publication 2005/0030674).

In re claims 1,7 and 10, Carey discloses an exchange coupled magnetic structure (Fig. 3a) that contains an emitter (138), a collector (136) formed adjacent to the emitter, a base (103/104/105) formed between the emitter and the collector and having a magnetization pinned layer of ferromagnetic material (103), a magnetization free layer of ferromagnetic material (105) and a nonmagnetic layer (104) between the magnetization pinned layer of ferromagnetic material and the magnetization free layer of ferromagnetic material, the magnetization pinned layer having a magnetization substantially fixed in an applied magnetic field, the magnetization free layer having a magnetization substantially free to rotate under the applied magnetic field, the base including an electrode configured to apply voltage between the emitter and the base (paragraph 6); and the nonmagnetic layer being configured to decouple exchange coupling between the magnetization free layer of ferromagnetic material and the magnetization pinned layer of ferromagnetic material, a tunnel barrier layer (134) of antiferromagnetic material formed

between the magnetization pinned layer of ferromagnetic material and the emitter or between the collector and the magnetization pinned layer of ferromagnetic material and provided with an exchange coupling with adjoining one of the magnetization pinned layer of ferromagnetic material, the tunnel barrier being dielectric and tunnel conductive (Page 3, Paragraph 0043), and the magnetization of the magnetization pinned layer of ferromagnetic material being fixed by the exchange coupling between the magnetization pinned layer of ferromagnetic material and the tunnel barrier of antiferromagnetic material.

In re claim 2, the antiferromagnetic material is cobalt oxide. (Page 2, Paragraph 0018).

In re claim 3, a dielectric layer (135) of nonmagnetic material formed in contact with the tunnel barrier layer of antiferromagnetic material.

In re claim 4, the magnetization pinned layer includes a metal selected from the group consisting of Fe, Co, Ni or an alloy containing the metal and the tunnel barrier layer of antiferromagnetic material contains an oxide of the metal. (Page 2, Paragraph 0018, Page 5, Paragraphs 0057,0059).

In re claim 5, the tunnel barrier of antiferromagnetic material is formed between the magnetization pinned layer and the emitter and the emitter include a semiconductor surface contacting the tunnel barrier layer of the antiferromagnetic material. (Fig.3a) (As stated in the specification of the application the tunnel barrier is a laminated surface with an antiferromagnetic material and a nonmagnetic material, so the tunnel and dielectric layer are considered the tunnel barrier layer and are contacting the emitter).

In re claims 8 and 11, the collector electrically coupled with an electrical field effect transistor and the spin-tunnel transistor and the electrical field effect transistor are formed on the same substrate. (Page 1, Paragraph 0003).

In re claims 9 and 12, a magnetic flux guide magnetically coupled with the magnetization free layer. (Page 1, Paragraphs 0004 and 0005).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim Rejections - 35 USC § 103 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action: (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carey as applied to claim 1 above, and further in view of Katti et al. (6707084).

In re claim 6, Carey discloses all the limitations except for the tunnel barrier in contact with the magnetization free layer. Whereas Katti discloses a spin valve (Fig. 4)

that contains a magnetization free layer (412) and a tunnel barrier (414), where the tunnel barrier is in contact with the magnetization free layer. The tunnel barrier is in contact with magnetization free layer to control the magnetization of the layer to allow for consistency of the switching magnetic moments at a low magnetic field, which improves switching reliability. (Column 6, lines 20-37) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was formed to modify the device of Carey by incorporating the tunnel barrier to contact the magnetization free layer to improve the switching reliability as taught by Katti.

Response to Arguments

Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection.

In regards to applicant's arguments that the Carey reference does not disclose an emitter or a collector, this is erroneous as it is disclosed in the reference that they are formed of conductive material and are adjacent to each other to enclose the base layer there between. In regards to the argument that layer 134 does not pin the pinned layer, this limitation is not being claimed and what is being disclosed is that layer 134 is the tunnel barrier layer as claimed. In addition applicant argues that the Carey reference does not disclose layer 134 to be a tunnel layer or tunnel conductive, as disclosed in the claim and specification of the pending application, the tunnel barrier layer is made of CoO. Layer 134 of the Carey reference is made of CoO and therefore is a tunnel barrier layer and is tunnel conductive, therefore the Carey reference does disclose the claimed limitation. In regards to argument that Carey et al does not disclose a base including an

electrode configured to apply a voltage between the base and emitter, however, Carey teaches that the contact pinned layer supply sense current to the device and measured to detect the varying device resistance induced by the external magnetic field therefore there are current/voltage going between the emitter and the base. Therefore the rejection stands.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tsz K. Chiu whose telephone number is 571-272-8656. The examiner can normally be reached on 0800 to 1700.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra V. Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zandra V. Smith/
Supervisory Patent Examiner, Art Unit 2822

TC